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Scintillating Bubble Chambers for Rare Event Searches

Friday, 14 February 2025 19:15 (15 minutes)

The Scintillating Bubble Chamber (SBC) collaboration is developing novel particle detectors sensitive to low-energy (sub-keV) nuclear recoils by combining existing bubble chamber technology with liquid noble detectors. This approach leverages the insensitivity to electronic recoils characteristic of bubble chambers alongside the scintillation yield from a liquid noble active medium. SBC aims to achieve detection thresholds as low as 100 eV through a multi-channel readout including acoustic, imaging, and scintillation signals. The collaboration is currently commissioning two identical 10-kg detectors: SBC-LAr10 and SBC-SNOLAB. SBC-LAr10, located at Fermilab, is nearing operation and will focus on detector calibration and CEvNS studies, while SBC-SNOLAB will be purpose-built for dark matter searches in the low-background environment at SNOLAB. This talk will provide a general overview of scintillating liquid noble bubble chambers and the current status of both detectors. Additionally, I will introduce the planned methodology for the multi-channel data acquisition system and sensory readout for SBC-SNOLAB.

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